

REMARKS

Claims 1, 2, 5, 8-16, 18, 20-24, 28, 30, 32-34 are amended and 35-41 added as new claims. No new matter is presented.

I. Response to Obviousness-Type Double Patenting Rejection

In paragraph 1 of the Office Action, claims 1-6, 9-14 and 16-33 are provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-20 of co-pending Application No. 10/583,711 (U.S. Pub. No. 2007/0151679).

In paragraph 2 of the Office Action, claims 1-14 and 16-31 are provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-4, 6, 8-12, 16-23 and 26 of co-pending Application No. 10/583,849 (U.S. Pub. No. 2007/0143932).

In paragraph 3 of the Office Action, claims 1-14 and 16-31 are provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claim 1-10, 12, and 15-22, of co-pending Application No. 10/583,339 (U.S. Pub. No. 2007/0164468).

In paragraph 4 of the Office Action, claims 1-14 and 16-31 are provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-4, 6, 8-12, 16-23 and 26 of co-pending Application No. 10/583,340 (U.S. Pub. No. 2007/0163735).

Applicants submit a Terminal Disclaimer herewith with respect to the '711, '849 and '339 applications, thereby obviating the rejections.

Applicants defer responding to the rejection based on the '340 application.

Accordingly, Applicants respectfully request withdrawal of the obviousness-type double patenting rejections.

II. Response to Claim Objections

Claim 12 is objected to as missing a period.

Claim 12 is amended herein by inserting a period at the end of the sentence, thereby obviating the objection.

Accordingly, Applicants respectfully request withdrawal of the objection.

III. Claim Rejections under 35 U.S.C. § 112, 1st Paragraph

A. Claims 9-13

Claims 9-13 are rejected under 35 U.S.C. 112, first paragraph, as allegedly failing to comply with the enablement requirement.

With respect to the recitation of the phrase “capable of being modified”, the Examiner states that Applicants give no teaching or suggestion of which groups can be modified or the process by which groups can be modified in the claim or specification.

Additionally, the Examiner states that Applicants fail to disclose which groups act as antifungal, antibacterial, heatproof, flame-retardant, UV-resistant, antistatic, or insulative agents such that a person of ordinary skill in the art could graft a modifying compound with a functional group to obtain the desired properties.

Applicants traverse the rejection.

The test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without

undue experimentation. A patent need not teach, and preferably omits, what is well known in the art.

In this case, the specification provides exemplary groups capable of carrying or being modified as recited in the claims in the paragraph bridging pages 14-15 of the specification. Therefore, in view of the teachings in the specification and the knowledge and skill in the art, one of ordinary skill in the art would readily be able to practice the claimed invention without undue experimentation.

Accordingly, Applicants respectfully request withdrawal of the §112, 1st paragraph, rejection.

B. Claim 30

Claim 30 is rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the enablement requirement.

The Examiner states that claim 30 recites “radiation capable of oxidizing the fibrous material” should be used but the specification nor the claim states how much radiation is needed, where and when the radiation is used on the fibrous material (low consistency, medium consistency, or once a sheet has been formed). The Examiner also asserts that it is not clear whether the radiation requires or does not require the other oxidizing agents (the enzymes, peroxides, etc.)

Applicants traverse the rejection.

The test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without

undue experimentation. A patent need not teach, and preferably omits, what is well known in the art.

In this case, the specification discloses at page 11, lines 26-30, that radical forming radiation comprises gamma radiation, electron beam radiation or any high energy radiation capable of forming radicals in a lignocellulose or lignin containing material. One of ordinary skill in the art is capable of adjusting the radiation such that radicals are created in the fibrous material. Therefore, the specification is sufficiently enabling to those of ordinary skill in the art.

Accordingly, Applicants request withdrawal of the §112, 1st paragraph rejection.

IV. Response to Claim Rejections under 35 U.S.C. § 112, 2nd Paragraph

Claims 8, 15, 22, 23, 30 and 32- 34 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite.

With respect to claim 8, the Examiner states that the phrases “preferably” and “in particular” render the claim indefinite.

Claim 8 is amended by deleting improper phrases.

Regarding claims 15 and 34, the Examiner states that it is not clear which compounds Applicants consider as derivatives or structural analogues of the claimed compounds.

Claims 15 and 34 are amended herein by deleting the phrase “or their derivatives or structural analogues”.

Claim 22 is rejected for reciting both a broad range and narrow range in the same claim. In claim 22 the Examiner states that recitation of “an amount of 0.0001 to 10 mg protein/g of dry matter” is a third range.

The recitation of the amount of 0.0001 to 10 mg protein/g of dry matter is a separate range from the enzyme dosage and therefore is not a narrower range of the enzyme dosage. Therefore, Applicants traverse this ground for rejection.

Further, with respect to claim 22, the Examiner states that the enzyme dosage. "nkat/g", is interpreted as referring to enzyme activity on pulp. However, the Examiner states that Applicants do not state what the defined assay conditions are for measuring the enzyme activity and therefore the Examiner cannot determine the proper metes and bounds of the claim since an enzyme can have different activity at different temperatures, pHs and depending on the substrate being oxidized.

Applicants traverse this ground of rejection and submit that the conditions for determining enzyme activity are described in the working examples. Activity/amount of fibre and protein concentration are different ways of dosing. The determination of the enzyme activities has been carried out in the examples in the same conditions (pH, temperature) using standard activity measurements in the conditions in which the enzyme treatments of the materials have been effected. Thus, in view of the above, one of ordinary skill in the art is readily able to ascertain the meaning and scope of the claims, when properly read in light of the specification.

Claims 32 and 33 are rejected for reciting the term "white color" which the Examiner states is a relative term. According to the Examiner, there are varying degrees of whiteness/brightness of pulp and as such the Examiner cannot determine how white/bright the lignocellulose needs to be to have a white color. The Examiner interprets this term as meaning "whiter" so that the agent only need to provide a color that is whiter than the untreated lignocellulose. Claim 34 is rejected as depending from claims 32 and 33.

Claim 32 is amended by deleting the phrase “said whitening agent being capable of providing the lignocellulosic fibre material with white colour” and claim 33 is amended by deleting the phrase “which is capable of rendering the fibre a white colour” as the term “whitening agent” inherently indicates that the agent is capable of providing a white color to the fibre material.

In view of the above, Applicants respectfully request withdrawal of the §112, 2nd paragraph, rejections.

V. Response to Claim Rejections under 35 U.S.C. § 102

The Present Invention

The present invention concerns a process for modifying the structure of a lignocellulosic, fibrous material. According to the invention, the lignocellulosic fibres are reacted with an oxidizing agent in order to oxidize at least a part of the phenolic (or similar) groups. As a result, an oxidized fibrous material is obtained which is then reacted with a modifying agent. The modifying agent contains at least one functional group which is compatible with the oxidized fibrous material and the modifying agent is by character such that it is capable of changing the properties lignocellulosic fibres, in particular it is capable of rendering them properties which they do not natively have. The underlined feature is expressed in pending claim 1 using the words “properties foreign to the native fibre”.

By means of the invention it is therefore possible to bind to the fibres a modifying agent having a preselected and desired activity.

The present invention comprises three advantageous embodiments which are examined in more detail in the description on pages 5 (last paragraph) and 6.

- According to a first embodiment, the modifying agent to be bonded to the fibres is capable of changing the properties of the fibres. By this we mean that the molecule of the modifying agent (in combination with the lignocellulosic matrix) is capable of providing novel properties (which are foreign to the native fibre).
- In a second embodiment, the modifying agent contains, in addition to a first functional group used for bonding, a second functional group which gives the fibres a modified surface.
- According to a third alternative the modifying agent functions as a linker via which a third component is bonded to the fibres. In the present application, this third component is also called a "functional agent".

Summarizing, according to the invention phenolic groups are oxidized and then a modifying agent is bonded to them via a functional group. When bonded to the fibres the modifying agent, optionally in combination with a functional agent, gives the fibres properties which they would not have otherwise. As specific examples of such properties the following can be mentioned: hydrophobicity, electric charge, colour and reduction in yellowing.

None of the cited references disclose, teach or suggest the present invention as recited in the claims.

A. Goodell

Claims 1-6, 9-15, 22-29 and 31-34 are rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Pub. No. 2003/0186036 Goodell et al (hereinafter "Goodell").

Applicants traverse the rejection.

Goodell relates to oxidation of organic compounds with hydroxy radicals which are formed in a mediated Fenton reaction in which the mediator comprises a redox cycling chelator. Goodell teaches oxidizing lignocellulosic materials and other phenoxy containing compounds. However, Goodell does not specifically disclose contacting the oxidized fibre material with a modifying agent containing at least one first functional group which is compatible with the oxidized fibre material and is capable of providing the lignocellulosic fibre material with properties foreign to the native fibre.

The Examiner states that Goodell discloses the use of querctin and kaemferol at paragraph [0099] during the reaction in addition to other compounds and that since these chemical additives are the same as those recited in the present claims, said agents act as modifying agents. However, these particular agents are taught as exemplary flavanoid redox cycling chelators and are not employed in the working examples of Goodell. Thus, this disclosure is not sufficient to anticipate the claimed invention. One of ordinary skill in the art would have to pick and choose amongst the various exemplary chelators to arrive at one of querctin and kaemferol and such picking and choosing is not permissible for an anticipation rejection. For at least this reason claim 1 is not anticipated by Goodell. Claims 2-4 and 19-29 depend directly, or indirectly, from claim 1 and are not anticipated for at least the same reasons.

Independent claim 5 requires a similar modifying agent as in claim 1 and therefore claim 5 is not anticipated for at least the same reasons as claim 1. Claims 6 and 9-15 depend directly, or indirectly from claim 5 and are not anticipated for at least the same reasons.

With respect to claims 32-34, Goodell uses hydrogen peroxide as a bleaching agent, whereas in the present invention the aim is to add compounds which give the fibrous material a white colour. Claim 32 recites that a whitening agent is contacted with the oxidized structural group on the fibre. This whitening agent is a compound which gives fiber a white color - it is a compound which brings the white color along. It is not a bleaching compound. The present invention is not about conventional bleaching, which resides in treating fibre with compounds which remove lignin etc. (components such as hydrogen peroxide, ozone, chlorine dioxide). Rather, a compound is introduced, for example an organic compound of the betuline, betulinol, kaempferol or quercetin type which gives the fibre a white colour and/or, when bonded to the fibre the compound prevents a heat or light-induced reversal of the color ("yellowing"). Thus, Goodell does not anticipate the claimed invention as recited in present claims 32-34.

In view of the above, Applicants respectfully submit that the present invention is not anticipated by Goodell.

Accordingly, withdrawal of the §102 anticipation rejection based on Goodell is respectfully requested.

B. Jaschinski et al

In paragraph 10 of the Office Action, claims 1-6, 9-14 and 23-33 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Pat. No. 6,136,041 Jaschinski et al (hereinafter "Jaschinski").

Applicants traverse the rejection.

Jaschinski concerns enhancing oxidizing bleaching of lignocellulose with additives such as phenantroline and polypyridyls and derivatives thereof.

Applicants submit that the chemicals mentioned by Jaschinski are not bonded to the lignocellulosic material but the compounds are merely added. For this reason, the claim element "...oxidizing phenolic or similar structural groups of the lignocellulosic material..." as recited in claim 1 does not read on the Jaschinski reference. Claims 2-6, 9-14 and 23-33 depend from claim 1 and are not anticipated for at least the same reason.

Accordingly, Applicants respectfully request withdrawal of the §102 anticipation rejection based on Jaschinski.

VI. Response to Claim Rejection under 35 U.S.C. § 102/103 based on Pedersen (U.S. Patent No. 6,187,136)

Claims 1-14, 16-33 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Pat. No. 6,187,136 Pedersen et al (hereinafter "Pedersen").

Applicants traverse the rejection.

Pedersen describes a method of attaching to lignocellulose material with the aid of enzymes (oxidases EC 1.10.3, peroxidases EC 1.11.1) small amounts of charged (negatively charged) phenolic compounds (carboxylic acid, salt thereof or ester). The aim is to increase bonding strength. Thus, in column 10, lines 61 to 67, and column 11, lines 1 to 10, it is stated that "The above results demonstrate that it is possible to increase the surface charge of lignocellulosic material [...] significantly by grafting a phenolic acid [...] onto the material [...]. [...] such an increase in surface charge will make it possible to incorporate an increased amount of an appropriately charged strengthening agent [...]. Thus, it is clear that the teaching of Pedersen is not to impart novel properties onto the fibres, i.e., "properties foreign to the fibres", but rather to modify, in particular increase, existing properties.

The present invention concerns a method of attaching compounds to the fibrous material which impart novel properties that the fibrous material does not natively have. The lignocellulose material has, by nature, a negative charge, and it contains pterulic acid type groups of the kind disclosed in Pedersen. For this reason, the present claims, as amended, do not read on Pedersen. The pterulic acid does not, in addition to the charge, impart any of the properties suggested in the Office Action (cf. claims 4, 7-19, 32-33). Neither does Pedersen disclose a two-step-bonding of the charge or other properties recited in the present claims. Thus, Pedersen does not anticipate the present invention.

Accordingly, Applicants respectfully request withdrawal of the §102 anticipation rejection based on Pedersen.

VII. Response to Claim Rejections under 35 U.S.C. § 103 based on Goodell

Claim 30 is rejected under 35 U.S.C. § 103 as being unpatentable over U. S. 2003/0186036 Goodell et al hereinafter Goodell.

Claim 30 depends from claim 1 and is patentable over Goodell for at least the same reasons discussed above.

Accordingly, Applicants respectfully request withdrawal of the §103 obviousness rejection based on Goodell.

VIII. Claim Rejection under 35 U.S.C. § 102/103 based on Pedersen

Claim 22 is rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Pedersen.

Claim 22 ultimately depends from claim 1 and is not anticipated nor rendered obvious for at least the same reasons as set forth above.

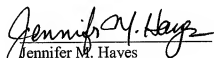
Accordingly, Applicants respectfully request withdrawal of the §102 anticipation, or in the alternative, §103 rejection based on Pedersen.

IX. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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